Tentative Outline

Special Thematic Issue for the journal International Journal of Sensors, Wireless Communications and Control

Title of the Thematic Issue:
Explainable Artificial Intelligence Empowered Federated Learning for 6G HetNet Security

Guest Editor: M. Rajesh

- **Scope of the Thematic Issue:**

The sixth-generation (6G) Heterogeneous Networks (HetNets) are more capable and provide global coverage with enhanced spectral at low cost, better energy efficiency and security. The 6G HetNets are capable of connecting a large number of nodes with different radio access technologies, which could provide widespread high-rate coverage and a unified user experience. The distributed and heterogeneous framework of the 6G HetNet makes it susceptible to attacks of denial of service (DoS), malware propagation, and malicious port scanning. The security issue is therefore an important concern in 6G HetNets. Since privacy and security are a key concern of the digital world.

A new intelligent technique is required for 6G HetNets, to provide strong security. In this regard, Explainable Artificial Intelligence (XAI) and Federated Learning (FL) are getting a lot of attention for their end-user trust and secured operation. They both individually have their own unique advantages. XAI aims to create a new Artificial Intelligence (AI) technique that enables end-users to understand and provide appropriate trust for the enhanced user experience. Meanwhile, FL enables end-devices to collaboratively train and update a mutual machine learning model while preserving the privacy of their data sets. In 6G HetNets: XAI empowered FL to build advanced AI-based security and make changes in the traditional security to provide hassle-free operation and improved security to the 6G heterogeneous networks.

In this regard, a common platform is always in need to share the views of different researchers relating to the recent advancement in 6G HetNets security with explainable artificial intelligence empowered federated learning. The aim of this Special Issue is to present the recent trends, research solutions, developments and applications that discusses security related issues of 6G HetNets.

Keywords: Explainable Artificial Intelligence (XAI); Federated Learning; 5G and 6G; Heterogeneous Networks; Privacy and Security; Threats.

Sub-topics:

- Security problems and solutions in 6G HetNets
- Architecture and privacy-preserving learning protocols in 6G HetNets
- Explainable artificial intelligence empowered federated learning-based privacy and security preserving algorithms for HetNets
- Physical layer security techniques
- Requirements/solutions for 6G HetNets physical layer
- 6G HetNets physical layer design and optimization
- Theories, frameworks, architectures, and systems for secured 6G HetNets
- Trustworthy 6G HetNet routing
- Network data collection and analysis for 6G HetNet
- Inter-operator security and trust protocol

Tentative titles of the articles:

- Ø A vision of self-evolving network management for future intelligent vertical HetNet
- Ø Federated learning with non-iid data in wireless networks
- Ø XAI in 6G: Energy-Efficient Distributed for Multilayer Heterogeneous Networks
- Ø Common threats Identification in the network layer using XAI and FL
- Ø Auction-Promoted Trading for Multiple Federated Learning Services in UAV-Aided Networks
- Ø 6G Survey on Challenges, Requirements, Applications, Key Enabling Technologies to Rectify the same
- Ø Client-edge-cloud hierarchical federated learning
- Ø Decentralized edge intelligence resource allocation framework for hierarchical federated learning
- Ø Hierarchical federated learning through lan-wan orchestration
- Ø The communication-aware clustered XAI based federated learning

Schedule:

- ✧ Thematic issue submission deadline: **30th June 2023**

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